An Integrated Approach to Observations of Pre-earthquake Signals. Why Geospace observations still need ground data?

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We are applying a scheme requiring interdisciplinary use of latest geospace and remote sensing technology based on multi platform data observations. This multi sensory approach utilizes atmospheric and ionospheric signals needed for the search of pre-earthquake signals in atmosphere. The proposed methodology uses existing satellite thermal observations (LEO, GEO) in conjunction with GPS/TEC (GNSS), atmospheric assimilation models and ground multi parameter continuous measurements to study physical processes described by the Lithosphere-Atmosphere-Ionosphere Coupling (LAIC) concept. We present results of analyzing five physical parameters- radon, seismicity, temperature of the atmosphere boundary layer, outgoing earth infrared radiation and GPS/TEC and their temporal and spatial variations several days before the onset of the following recent earthquakes: (1) 2016 M6.6 in California; (2) 2016 M6.4 of Feb 06 in Taiwan and (3) 2016 M7.0 of Nov 21 in Japan. Our preliminary results of simultaneous analysis of multi-parameter data suggest that pre-earthquake phase follows a general temporal-spatial evolution pattern, which plays a critical role in the understanding of LAI coupling associated with earthquake processes. This pattern could be reviled only with multi instruments observations from space and ground and been seen and in other large earthquakes worldwide.

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